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One size does not fit all: Universal livelihood insurance in St. Lucia

Chris Knudson*

Graduate School of Geography, Clark University, 950 Main Street, Worcester, MA 01610, USA

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ABSTRACT

In 2015 the G7 countries announced the InsuResilience project to quadruple, by 2020, the number of people in the Global South who have financial risk management tools against climate change. A principal way this will occur is through weather index insurance (WII), a type of insurance that pays out according to estimated losses rather than actual ones. In this paper, I examine one WII product that has been for sale in St. Lucia since May 2013, called the Livelihood Protection Policy, which has been discussed as a model WII product for InsuResilience. This article is based on twelve months of fieldwork conducted in St. Lucia, interviewing people involved in the design, implementation, and distribution of LPP, and actual and potential purchasers of LPP. In this article, I argue that LPP's design as a microinsurance product that can be purchased by any St. Lucian no matter their livelihood has made it largely undesirable because it does not fit anyone's needs well. This occurs for two main reasons. First, rather than primarily being used to help low-income St. Lucians adapt to climate change, LPP was used to test out how an abstract index insurance product can be sold without directly subsidizing the premiums of policyholders. Second, by not being designed for particular livelihoods, LPP suffers from not addressing hazards, such as drought, that many St. Lucians are highly exposed to, and from not compensating policyholders at meaningful wind and rainfall thresholds.

1. Introduction

When the G7 countries gathered in the summer of 2015 to launch InsuResilience – an ambitious plan to increase the number of people in the Global South who have access to financial risk management tools against climate change from one hundred million to five hundred million by 2020 – this pledge marked a claim on an enormous market previously inaccessible to the insurance industry (G7, n.d). With the support of the G77 and China, international financial institutions were able to convince most Global North countries that they needed to spend more on managing the consequences of climate change in the Global South. These financial corporations positioned themselves as expert intermediaries that could help advance new climate policy goals by selling insurance.

Backed by pledges of more than US$400 million, the InsuResilience project will expand hazard risk management through a financial product called weather index insurance (WII). Rather than paying out according to actual, and assessed, damage as traditional insurance does, WII pays out the same amount to policyholders within a particular region. When a storm occurs, for example, satellites would measure key weather variables, such as rainfall. Payouts are then triggered when one of these variables reaches a certain threshold. This switch in the focus of financial risk management products from asset (as in traditional insurance) to hazard greatly reduces the cost of the financial product because only certain characteristics of the hazard need to be measured – extent and location, for example – and not the messy details of who lost what. This subtle shift of focus from asset to hazard is based on both the motivation to sell the product – many countries in the Global North are using financial means to address hazards they feel responsible for, rather than foster any particular kind of local production in the South – and the operation of the product, which requires no knowledge of what happens to production after a disaster.

This article analyzes a WII product that has been for sale in the Eastern Caribbean island of St. Lucia since May 2013, called the Livelihood Protection Policy (LPP), which pays out for excess wind and rainfall. LPP is an unusual kind of WII product because it can be purchased by any St. Lucian, no matter their livelihood. While WII, by construction, can function without the policyholder owning specific assets, almost all existing WII products are targeted to specific consumers, like maize farmers. That is, almost all WII products are designed for particular livelihoods even though the actual losses from that livelihood are not measured to determine the payout.

In this article, I argue that the abstractions inherent in LPP's design as a universal form of insurance have rendered it unable to meet its goal

* Address: The University of Arizona, Institute of the Environment, 1064 E. Lowell Street, Tucson, AZ 85721, USA.
E-mail address: chrisknudson@email.arizona.edu.

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of "help[ing] vulnerable, low-income individuals recover from the damage caused by strong winds and/or heavy rainfall during hurricanes and tropical storms" (MCII, 2013a, p. 1). This occurs for two main reasons. First, LPP was created by the non-profit research wing of a large reinsurance company as a policy experiment to capture more of the global market for compensating losses deemed beyond adaptation. Rather than only being used to help low-income St. Lucians adapt to climate change, LPP was also used to test out how an abstract index insurance product can be sold without directly subsidizing the premiums of policyholders (Lashley, 2012, p. vii). Second, by not being designed for particular livelihoods, LPP suffers from not compensating policyholders at meaningful wind and rainfall thresholds. These two elements of LPP's creation and design conflict with its purpose to help vulnerable, low-income St. Lucians after storms.

Although LPP is a rare form of WII in that it is open to any St. Lucian, of any livelihood, it has a lot to tell us about the future of climate risk insurance that is primarily designed around protecting against hazards (such as extreme weather events believed to be increasing because of climate change) rather than protecting any particular assets and livelihoods. And it is this universality that may make LPP's hazard-first focus a lot more common if InsuResilience achieves its goals using LPP as its model, as InsuResilience supporters have indicated (German Federal Ministry for Economic Cooperation and Development, 2015).

To make this argument, I am drawing on twelve months of fieldwork conducted in St. Lucia from July through December 2014, May through August 2015, and from January through March 2016. In St. Lucia, I interviewed people involved in the design, implementation, and distribution of LPP, including at the underwriter level, and at banks and producer co-operatives and associations who sold the product. Additionally, I interviewed actual and potential purchasers of LPP, principally banana farmers and honey producers. I am also drawing on my analysis of the documents written to support LPP's development and sale: primarily, the commissioned academic research and report examining the demand for the product in the Caribbean, and LPP's promotional material. Finally, I am drawing on data I obtained through LPP's underwriter on the policyholders' demographic and livelihood characteristics, and on the policies themselves, for all policies sold in St. Lucia from May 2013 to December 2015.

The paper's argument proceeds as follows: First I review the literature on insurance and climate security to show that financial risk management products designed for climate risks can produce unintended and undesirable outcomes. In the following section, I show how before LPP's introduction the only insurance available in St. Lucia to protect a livelihood against storms was a banana insurance program that was designed to assist both the farmer and the state. I then show how LPP was designed as a rare form of universal WII to try to appeal to all low-income St. Lucians. In Section 5, I explain LPP's origins as a product created to compensate for loss and damage, the new, third pillar of climate change management, alongside mitigation and adaptation. Finally, in the last section and the conclusion, I argue that LPP's universality undermines its ability to adequately protect its intended purchasers, and helps explain the low uptake of the product.

2. Insurance and climate security

What we know of as modern insurance flourished in thirteenth century Italy, when merchants became more sedentary and sent their goods over the seas unaccompanied. Wanting to protect the value of all the commodities their ships carried, they bought another commodity – an insurance contract – that isolated the risk of their goods in motion into a new and different private good. This contract held the risk apart from the physical good, and for the first time could be bought and sold independent of that underlying good. Since the seventeenth century, the international laws of marine insurance required that an insurance contract be tied to a commodity (Levy, 2012). This requirement of "double commodification" – that is, the existence of both an underlying commodity, and the financial commodity that insured it – provided two benefits. The risk could be priced accurately because the underlying asset was standardized (first commodification). And the costs of assessing the risks could be spread across the many insurance contracts sold (second commodification) (Levy, 2012). While the great majority of insurance is still based on an underlying commodity, the Livelihood Protection Policy (as a form of WII) is not because it is a derivative (as explained in Section 4) rather than a standard insurance contract. It is the underlying commodity that focusses standard insurance on the social world. By not requiring double commodification, WII does not need to concern any other commodity except itself. We will see how LPP uses this non-requirement of an underlying commodity to have no link with the social world when it comes to payouts. This exclusion of certain elements of the social world is an expansion of the exclusion of "particular perils and places" that insurance risk requires (Johnson, 2013a, p. 2670). By excluding the social relations of production and including only the hazard within its indemnity model, LPP presupposes that any failures in risk management will be taken up by the state or local communities.

The attraction of political projects such as InsuResilience lies in the ability of insurance to provide security, rather than to bring about a better adapted population (Grove, 2013a,b). One of the principal scholars of this approach to insurance is Francois Ewald, who argued that the construction of risk within financial risk management was a key moment in the history of liberal governance. Ewald wrote that calculating risk "means no longer resigning oneself to the decrees of providence and the blows of fate, but instead transforming one's relationships with nature, the world and God so that, even in misfortune, one retains responsibility for one's affairs by possessing the means to repair its effects" (Ewald, 1991, p. 207). For Ewald, a key part of liberal governance was conditioning its subjects to accept responsibility for their own risks. Lobo-Guerrero (2010a,b) has developed a biopolitical reading of insurance, wherein the real purpose of insurance is to exercise power for the "protection and promotion of forms of life" (Johnson, 2013b) While insurance is typically described as allowing for the reconstruction of property, its principal utility is to secure populations.

Climate security projects like InsuResilience use catastrophe models as a "methodology for the calculation and creation of contingent assets out of the fabric of insured environmental and financial vulnerabilities" (Johnson, 2013b, p. 30, 2014). These catastrophe models do not use the archival-statistical knowledge of traditional insurance in order to predict possible futures, and to price them in insurance contracts (Collier, 2008). Rather, the paucity of archival-statistical knowledge about extreme weather events requires a new form of knowledge, which Stephen Collier calls *enactment*. This approach takes as data what is known about both the vulnerable elements, and the hazard, and processes them through a catastrophe model. Kevin Grove has analyzed the catastrophe models that underlie an insurance program in the Caribbean, known as the Caribbean Catastrophe Risk Insurance Facility (CCRIF), which operates like WII for governments, rather than individuals (Grove, 2012). Grove showed how the purpose of CCRIF is not to cover losses to the state from hurricanes, but to provide the state with enough capital so that it can remain secure, and not risk its ability to govern.

Contemporary forms of climate insurance are designed to fulfill multiple and often conflicting goals. While they are ostensibly designed to assist the vulnerable against extreme weather events, and climate variability and change, they are also designed to secure the state, manage losses from the expansion of industrial capitalism, and provide new ways to financialize nature. From these conflicted goals, climate insurance also generates outcomes that are unforeseen and undesirable from the point of view of the designer. These outcomes often arise out of treating risk as a product of socionatural relations that is best mediated by finance. Such treatment of risk can result in incentives for harmful choices and increased inequality between social groups. In an exhaustive review of the maladaptive outcomes of climate insurance in

agriculture, Müller et al. (2017) demonstrate how such insurance programs shape land-use decisions and can have negative consequences for natural capital (including, greater cultivation of cash crops over drought-resistant ones, more cultivation in environmentally sensitive marginal lands and more agrochemical input use) and social capital (including, possible reductions in informal community risk-sharing arrangements). Analyzing index insurance in particular, Taylor (2016) argues that by not considering the structural and relational dimensions of risk production – such as the way that risk is managed and experienced unevenly between social groups – the benefits of insurance products will remain tenuous and fragile. Taylor shows that mismatches between policyholders' experienced losses and the losses estimated for the payout (known as basis risk) can have a class bias favoring better-resourced herders because lower loss rates are determined by access to resources, which are shaped by social hierarchies.

Another way in which index insurance can shape socioecological relations is through the displacement of existing coping mechanisms that are important for personal or group identity. Johnson calls this the creation of "risk-bearing" subjects who are "increasingly charged with their own self-care through private market mechanisms" (Johnson, 2013a, p. 2667). In a study of a pilot WII project in northern Ethiopia, Peterson found that index insurance changed the ways that households approached their risks. Not only were informal risk-sharing methods altered, but crop planting schedules and even crop types changed as well. These modifications to risk management can have knock-on effects. Peterson saw how WII decreased the short-term environmental risks of policyholders, but opened them up to market risks (Peterson, 2012).

3. St. Lucia's banana insurance

From the late seventeenth to the early nineteenth century, France and England fought repeatedly over St. Lucia, with England finally gaining lasting control in 1814. During this period, when the island changed ownership from one empire to the other, or was declared neutral territory between the two, twelve times (Harmsen et al., 2012), St. Lucia's cultural and political system was devoted to sustaining the profits from the sugar plantations (Mintz, 1985). Although the legal institution of slavery ended in St. Lucia in 1834, all former slaves, numbering approximately 13,280, had to remain with their former masters for another four years, obligated to perform further substantial unpaid labor (Harmsen et al., 2012). For the next century, sugar was produced in St. Lucia under a sharecropping arrangement that sought to preserve the inequalities of the slave system (Slocum, 2003). However, slowly over time, as the sugar industry in St. Lucia failed, smallholder farmers, typically on family land, began to produce and export bananas as part of their crop diversification (Slocum, 2003). Despite these benefits for the smallholder growers, the replacement of sugar by another monocrop perpetuated many of the same vulnerabilities and dependencies that had plagued St. Lucia for centuries. While the United Kingdom entered into a preferential trade agreement with St. Lucia after its independence in 1979, this ended in 1997 when the World Trade Organization found the trade agreement to be invalid (Slocum, 2006).

In addition to this exposure to the international economy's trade regime, St. Lucia's banana industry was threatened by a growing environmental exposure. After forty years without a powerful tropical storm, hurricanes hit the region in 1979 and 1980. In 1988, St. Lucia, and three of its neighbors – Dominica, Grenada and St. Vincent – established The Windward Islands Crop Insurance Ltd., or WINCROP, to insure banana production (Roberts, 2005). The insurance passed an important first test the next year when banana plantations on the islands were devastated by Hurricane Hugo, but were quickly rehabilitated (Benson and Clay, 2003). WINCROP's high reinsurance[1] costs explain why for many years, until the introduction of weather index insurance in the Caribbean, the only agricultural insurance products available to individual farmers in the Caribbean were WINCROP and a multi-peril insurance program in the Dominican Republic (Carballo and dos Reis, 2013).

4. The livelihood protection policy

The undersupply of non-WII agricultural microinsurance in the Global South (as evident in how rare a product like WINCROP is in the Caribbean) is due almost entirely to the extraordinarily high costs of providing it. Indeed, there is not a standard agricultural microinsurance program in the world that is not subsidized by the local government, typically at five or six times the value of the incoming premiums (Roth and McCord, 2008). The causes of this market failure are similar to why the more informal risk coping mechanisms fail after a widespread natural disaster. In the language of insurance providers, when risks are concentrated in a small geographic area, there is a statistical variance reduction that undermines the benefits of risk pooling. When the majority of individuals are under threat of a natural disaster they are said to share highly covariate risks.

The key insight of WII designers was to take the problem of high correlation and make it the basis of the product: all policyholders are considered to be similar enough that they can be given the same payouts for a particular extreme weather event. This operationalization, however, leads to basis risk – the uninsured losses that remain after payouts – because the covariate risks are not identical among the policyholders. As Taylor argues, these differences among policyholders mean that some will experience higher levels of basis risk than others (Taylor, 2016). Jensen et al. found that in addition to uneven reductions in covariate risk exposure, there remain substantial levels of "mostly random idiosyncratic risk" for policyholders, in addition to the hazard risks that the index insurance is designed to manage (Jensen et al., 2016). This underscores the need for informal risk sharing agreements, such as through social networks and income diversification (Johnson, 2013a).

This tactic of assuming covariate risks among policyholders can be thought of as moving away from the insurance model toward the derivative model. We can think of insurance and derivatives as existing along a continuum, with insurance at one end representing – as an ideal – perfectly independent risks, and derivatives at the other, with their perfectly correlated, systemic, risks (Hess et al., 2005). The insurance model of risk management works for events like car accidents, for example, where the likelihood of most drivers making claims within a few days of each other is very low. Financial derivatives, such as options or futures, on the other hand, operate by deriving their value from an underlying commodity, like a natural resource, or an index like a currency. A derivative risk is correlated because its value is tied to a singular value.

For WII products, the underlying entity is not a commodity, but a weather index. This reduces the cost of the reinsurance for the products because the input to the risk is solely a weather variable at a particular point in space, rather than a collection of independent losses that is harder to predict. These spatial and temporal simplifications of WII result in further cost savings, such as not needing to visit policyholders before and after extreme weather events to first assess the value of assets and then the amount lost.

One significant division in WII projects concerns the scale at which the insurance is sold. Most WII is sold to individuals, like LPP. However, tens of millions of people are indirectly insured through index insurance sold to governments. Known as parametric insurance, this approach takes all the elements of WII that differentiate it from standard insurance and applies them to enormous insurance pools. The country of St. Lucia, for example, is one of sixteen countries covered by CCRIF, which pays out for earthquakes, tropical cyclones and excess rainfall, as determined by triggers.

Even though no WII product needs to be premised on a pre-existing

[1] A reinsurer provides insurance for primary insurance companies.

commodity – because they are derivatives whose payouts are tied to weather variables – in a review that I conducted of past WII projects, the only product I found that did not require a specific underlying set of commodities or assets whose properties could be modeled was LPP.[2] That is, LPP does away with the longstanding requirement of "double commodification" found in standard insurance. With LPP, not only do the products' designers not need to measure any characteristics of the socionatural relations that are being insured, the underlying assets do not even need to exist. Instead, the underlying socionatural relations to be insured are a generalized set of livelihoods and productive assets. In this way, LPP resembles parametric insurance, like CCRIF, in that such government-level index insurance does not have asset requirements to become a participating state.

Financial risk management products for environmental losses can vary in the emphasis placed on either the hazard or asset element. The typical "double commodification" requirement of standard insurance tends to place more specificity on the asset than the hazard. Although WINCROP, for example, insures against hurricanes, there may be other hazards that lead to compensated loss, combined with the hurricane. Nematodes, for example, can weaken the roots of banana plants and be a contributing hazard that leads to greater losses to high-speed winds. WINCROP's greater specificity, therefore, lies in the insured assets, where only bananas, as a commodity, are insured. This emphasis of the asset over the hazard is reversed in LPP. While the product's insured asset is generalized to an unspecified "livelihood", the hazard is strictly limited to the high-speed winds and heavy rains of tropical storms. As we will see, LPP's greater focus on the hazard, rather than the asset, is apparent in the operational and discursive elements of its construction.

4.1. The structure of LPP

When St. Lucians want to purchase LPP coverage, they buy it either for the North of the island, for the South, or for both zones. Because the policies are not tied to specific assets owned by the purchaser, one can also buy the product to compensate someone else, with the payout going into the latter's bank account. Both the North and South zones have their own particular wind and rain triggers. Using satellites, wind is measured as instantaneous speed, and rainfall is measured cumulatively within a single day. If both rain and wind triggers are exceeded, the payout takes the higher trigger of the two and compensates at that rate. Each trigger is associated with a frequency of occurrence. As the wind or rain becomes more excessive, the payout scales with it, though not proportionally. (See Fig. 1 for the triggers and payouts for wind in the North.) For example, a ten-year event will result in a payout of 20% of the value of the contract, and a 100-year event will pay out the maximum amount.

St. Lucians can buy up to ten policies, with each policy sliced into ten segments. Each segment will pay out a maximum of EC$1000 (US $370). The cost of the insurance is 8% of the contract's maximum payout. So if one buys one segment of a policy, the yearly premium costs EC$80 (US$29.60). A single policy can pay out multiple times until the maximum payout is reached. Once the payout limit is reached, or the twelve-month expiration date is reached, a policyholder will need to renew the policy to remain covered. Once the purchaser has made all the choices – beneficiary, location, coverage – the policy comes into effect ten days later. This prevents one from buying insurance with the knowledge of an impending storm (EC Global, 2013; MCII, 2013a,b,c).

In order to see how the model's calculation works, I will focus on the North region of the country, looking at payout for the wind hazard. From Fig. 2, below, we can see that the model is a step function that takes in wind as the input, which is the independent variable, and outputs the indemnification amount. This input determines the payout. Looking at the part of the graph ≥ 62 mph and < 86 mph, representing a 20% payout of one EC$1,000 contract, we see that any wind speed value in this range is rounded down to 62 mph, and multiplied by the constant EC$3.23/mph, or a little more than three East Caribbean dollars per mph of wind in this range to result in the EC$200 payout. This constant represents all socionatural relations involved in loss from high-speed wind. This means that the differences we see between St. Lucia's two coasts, and between the coasts and the interior – or the smaller differences of place found even in one valley – are irrelevant. And so, too, are the contents of space, so that whatever is lost is priced the same. All that matters are the hazards.

5. The construction of LPP

The Livelihood Protection Policy was conceived as a policy experiment within the Munich Climate Insurance Initiative (MCII). MCII was created in April 2005 by the reinsurer Munich Re as a non-profit research and development group that serves to bridge the various perspectives on financial risk management: NGOs, academics, and government representatives work alongside the insurers. Their work is guided by MCII's three stated objectives: (1) to develop insurance products for climate change hazards, using public and private resources; (2) to conduct pilot projects for such insurance products; and (3) to promote insurance as a climate change adaptation strategy, working within existing frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) (MCII, 2005). The end result of the non-profit MCII's work is to advocate for, develop, and test new financial products in order to bring into Munich Re's accounts the business of low-income people in the Global South who have traditionally been priced out of the insurance market for climate change risks.

In March 2011, MCII developed the Climate Risk Adaptation and Insurance in the Caribbean (CRAIC) project. The goal of the project is to "design and implement products that combine risk reduction and insurance to protect the livelihoods of low income groups in the Caribbean" (MCII, 2012). The Caribbean became the focus of an insurance product because of two events in December 2008. The first involved the influence of the NGO GermanWatch, which was one of MCII's founding members. In their 2009 Climate Risk Index, released during the UNFCCC meeting in Poznań, Poland, GermanWatch identified several Caribbean islands, including St. Lucia, as so-called hot spots. The group argued that small island developing states are particularly vulnerable to climate change. At the same time, MCII members participating in the Poznań talks heard the Alliance of Small Island States (AOSIS), which includes St. Lucia, make a forceful case for the necessity of more financing for managing climate change impacts. These two events spurred the creation of CRAIC a couple of years later, and put the focus on Belize, Grenada, Jamaica and St. Lucia as possible locations for a WII product.

AOSIS was arguing in particular for support within the UNFCCC of what is known as "loss and damage". L&D covers events that are especially difficult to adapt to, such as extreme weather events, like hurricanes, as well as slowly occurring disasters, like species extinction, desertification, and the submersion of low-lying small island developing states. As the Intergovernmental Panel on Climate Change (IPCC) has made more severe and confident predictions for losses from climate change hazards, the UNFCCC has shifted its focus from primarily mitigation, to mitigation and adaptation, to "the current era in which loss and damage has emerged alongside adaptation and mitigation" (Roberts and Huq, 2015). While AOSIS had been arguing for the recognition of L&D since the beginning of UNFCCC negotiations over twenty years ago, reinsurers, including MCII, have only more recently

[2] There are WII projects that do not check whether a herder, for example, is raising livestock to sell as a commodity. However, these projects are premised on the livestock, or other asset, being sufficiently standardized, and belonging to a known class of goods, so that the models can be constructed with an understanding how they react to drought, for example.

Return Period (in years)	Wind Trigger (in mph)	Rain Trigger (in mm)	Payout (% of sum insured)	Payout (USD)
10	62	207	20%	$74
30	86	241	40%	$148
75	104	269	75%	$277.50
100	110	278	100%	$370

Fig. 1. Contract terms for 1 segment of an LPP policy.

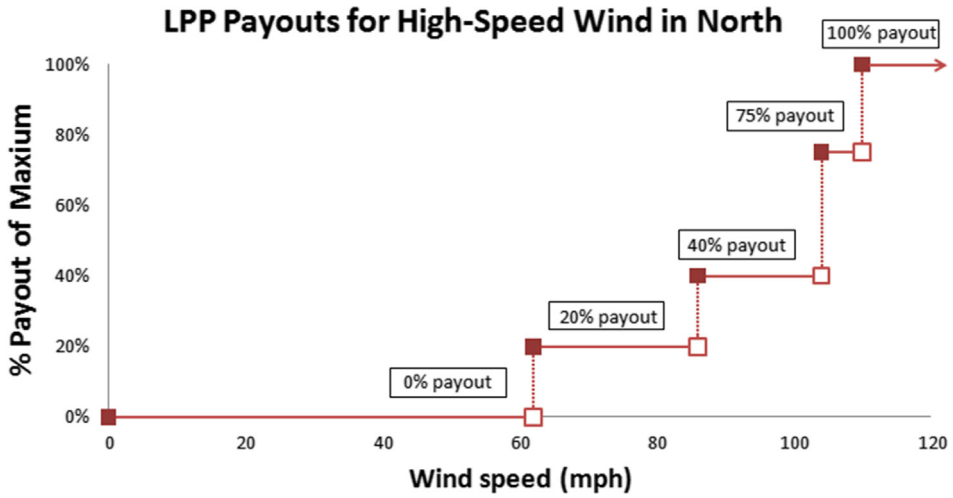

Fig. 2. The payout for LPP depends on the range in which the wind speed falls.

been "particularly active in the UNFCCC discussions about L&D" (Surminski and Eldridge, 2015, p. 224). The considerable work of AOSIS and the reinsurance industry, among others, paid off in the COP21 meetings in Paris in December 2015 when, for the first time, L&D was recognized in a global climate agreement. As a concession to the U.S. and other Global North countries, the Agreement does not permit claims for liability and compensation by countries experiencing L&D from climate change. But what is permitted, and encouraged, is the subsidization of climate risk insurance by the Global North, such as through the MCII-supported InsuResilience project that was launched alongside COP 21, and which has already received pledges of US$420 million by G7 countries.

Through reading background documents from MCII, and interviewing a senior CRAIC team member, it is clear that LPP was designed more to test out a product that can be used for L&D than to advance specific development goals. The first two of the three "specific project objectives" were to: (1) "Understand the needs of low income groups in managing loss and damage from weather-related events;" and (2) "Inform policy discussions on loss and damage in the UNFCCC process with parameters for making certain tools like insurance effective in assisting low-income groups in managing loss and damage" (Lashley, 2012, p. vii). (The third objective was to use the research results to create LPP.) Through these goals, we can see how LPP fulfills MCII's mission of developing "pilot projects for the application of insurance-related solutions" (MCII, 2005), in this case, for a highly general and flexible kind of WII that could be sold with little modification across the world for loss and damage compensation. Drawing on Peck and Theodore's concept of "fast policy" (2015), wherein there is a high degree of policy experiments across different contexts in a short period of time, Alpen Sheth argues that index insurance has been such a site of policy mobility – despite the very low demand for WII among the world's poor (Jensen et al., 2016) – where insurers' constant experimentation for a successful model can be seen as the search for a policy that can be easily translated (Sheth, 2017). LPP's universal approach to livelihoods makes it even more adaptable to the context of other countries than the standard kind of WII.

At the same time, the senior CRAIC team member described LPP to me as a way to test the hypothesis that index insurance could be sold in the Caribbean to low-income vulnerable people, of any livelihood, who have been overlooked by standard insurance and have irregular income streams (Interview with CRAIC employee, 2015). In particular, LPP was said to have been developed for the one in three St. Lucians who were self-employed, and largely worked in the most vulnerable sectors in St. Lucia: agriculture and tourism. Thus CRAIC wanted to create a WII product that would also reach the large numbers of low-income St. Lucians not working in agriculture, including the three-quarters of the population that live in urban areas. This is the primary reason why LPP addressed storms and not drought. Through LPP's name and stated goal of protecting "the livelihoods of low income groups in the Caribbean", we can see how MCII is drawing on the long history of the "livelihood approach" in development theory and practice (MCII, 2012). LPP was designed to support the production and protection of livelihood assets, which are often framed as five types of capital: natural, physical, human, financial and social. LPP can be understood as an attempt to increase St. Lucians' financial capital in order to reduce shocks to their other capitals. This emphasis on material well-being in the livelihood approach has been critiqued by Carr as limiting explanations for behavior to only those that concern the management of one's material circumstances (2013). As we will see, this focus on only the economic aspects of managing risk helps explain the low demand for LPP by its intended purchasers.

Germany's Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety gave CRAIC €2,035,530 to develop LPP, even though Munich Re's profits exceeded €3 billion in 2015 (BMUB, 2015). This funding was used to roll out the product: researching demand, designing the model, training the distributors, and marketing the product. The demand study research took place in the four chosen countries (Belize, Grenada, Jamaica and St. Lucia) in order to understand what the possible purchasers would pay for it. CRAIC's researchers surveyed 1,059 people across the four countries. They found a normal distribution for LPP demand that ranged from "none" to "very high." In St. Lucia, 16% of the population had no demand for the

product, and 29% had high or very high demand. From these results, they determined that although the interviewees' explicit demand was only moderate, there was "a clear implicit demand due to their level of exposure to weather-related risk" (Lashley, 2012, p. 41). The researchers interpreted this implicit demand as a "need" for LPP (Lashley, 2012, p. 40) because of the respondents' losses from flooding and high winds in the region, and because insurance use after a disaster was much lower than the use of savings or borrowing from financial institutions, family, or friends (Lashley, 2012, pp. 35–36). This framing of the demand for microinsurance has been critiqued by Da Costa, who argues that proponents of microinsurance believe that "insurance is a self-evident necessity in the lives of the poor because of widespread risks and limited coping capacities" (2013, p. 848). MCII not only inferred that microinsurance was the solution to hurricane risk for low-income St. Lucians, but also that LPP, as a particular form of WII, was what this population wanted.

The next step in the demand research was to determine the premium as a percentage of expected payout. The median response of low-income St. Lucians was that they would pay a premium of 4.1% of the payout (for example, in order to get a $1,000 payout, the median of those surveyed expected to pay $41) (Lashley, 2012). Recall from Section 4.1 that the premium chosen for St. Lucia was 8%, at least roughly twice what half the respondents said they would expect to pay. Taking the poverty line of EC$6,357.50 as the maximum income that MCII is targeting – and about 30% of St. Lucians are below this line – then the premium for one segment of one policy (EC$80) is two-thirds of a week's income (ISDR, 2012). And considerably more for those well under the line. Although the German government subsidized the creation of LPP, the St. Lucian underwriter would only generate a profit by selling LPP in high volume with a sufficiently high premium (Interview with CRAIC employee, 2015). As we will see, the small number of LPP policies sold – 139 from its beginning to the end of 2015 – likely resulted in small, if any, profits for the underwriter, despite the product being created with a subsidy and having a high premium.

5.1. InsuResilience

The InsuResilience project aims to add, by 2020, an additional 300 million people with access to indirect insurance – that is, through national and regional governments – and an additional 100 million people with access to direct insurance policies, that is, insurance bought by individuals (BMZ, 2015). The indirect insurance will be modeled after CCRIF and other parametric insurance agreements that disburse funds directly into its member governments' accounts so that they can quickly provide aid and reconstruction. And the goal of the direct insurance – to provide insurance with unsubsidized premiums to the "extreme poor [in climate vulnerable developing countries] with less than 1.25 USD PPP/day and the poor with less than 2.00 USD PPP/day who would slip into extreme poverty when disasters occur [without insurance]" – could very likely only be accomplished through WII (BMZ, 2015, p. 7).

In Munich Re's half-year financial report of 2015, the company's chairperson gave the growth potential of this market top billing in his letter to shareholders, calling "insurance against the negative impacts of climate change… a compelling idea whose time appears to finally have come" (Munich Re, 2015, p. 2). Referring to the goals of the InsuResilience project, he saw the "immense figure of 400 million additional people in need of insurance… [as] the potential available to us if we succeed in developing a sustainable insurance model for them" (Munich Re, 2015, p. 2). These 400 million people are only the beginning, though. In an MCII press release during the UNFCCC talks in Paris December 2015, MCII Vice-Chair Christoph Bals states that "it is an international task to find viable pathways to ensure the poorest land quickly back on their feet after a weather disaster," referring to the "more than 2.3 billion people [who] currently live on less than US$1.25 a day, most of [whom] depend on agriculture for their livelihoods" (Yi, 2015).

There are a few reasons to think that the direct insurance within InsuResilience will be modeled after LPP. The chair of MCII, Peter Hoeppe, referenced LPP when discussing InsuResilience with the press during the Paris talks. MCII, which plays a key role in InsuResilience, wants to build on existing projects (Scheinman, 2015). And LPP was one of three direct insurance products that were given as example approaches in the German government's Background Paper on Climate Risk Insurance (German Federal Ministry for Economic Cooperation and Development, 2015). Additionally, the need to keep down costs, while also quickly expanding to many large and disparate regions – InsuResilience is planned for Sub-Saharan Africa; the Middle East and North Africa; South Asia; East Asia and the Pacific; and Latin American and the Caribbean – means that there may not be time to find the specific triggers for every imaginable livelihood. With LPP's approach, only one product need be developed for the whole world, with the premium and trigger levels tailored to particular areas. In the end, it could very well *be* LPP which is modified to be sold around the world. LPP in St. Lucia, in a sense, is already two different products, with different triggers for the North and South, albeit with the same premium rate. Although LPP has not sold well in St. Lucia, its use within InsuResilience, as a product to manage L&D payments, is better aligned with CRAIC's goals and LPP's universality. Moreover, the target is for 80% of InsuResilience policies to be indirect insurance, so that for this majority the question is of whether the state, rather than individuals, can afford the coverage.

6. The consequences of LPP

In its first three years, LPP only paid out its policyholders once, when a low pressure trough released about eight inches of rain in a few hours on December 24, 2013. The rainfall triggered a 40% payout in the North, and a 100% payout in the South. At that point in time, only five policies had been sold. In the following discussion, I will focus on the experience of beekeepers with LPP for several reasons. First, this group consisted of about 20% of the total number of agricultural producers that bought LPP over the study period, and 40% of the people who were paid out in the first two years. Second, it is important to understand the experience, and dissatisfaction with LPP, of those policyholders who were paid out. Finally, beekeepers provide important insight on how the scale of WII can be transformed from the individual to the group.

One of the five policies sold before the payout, with one segment covering the North and one the South, was bought by Mille Fleurs, a honey producer's association. I interviewed an executive at Mille Fleurs – who himself is also a large-scale honey producer with 120 hives, whom I will call Michael – about the purchase of LPP. Mille Fleurs bought the policies to compensate its members after heavy rains. The purchase was partially a trial, too, to see how it would fare after a storm. Although Mille Fleurs is a registered distributor of LPP, it has only sold the policies to itself. "LPP is not really being bought by honey producers," Michael told me. "We might have to promote it more for it to be bought more, but we're not really interested in doing that. Last year the response [for LPP] was low." This low interest and response to LPP does not mean that beekeepers are uninterested in insurance designed for their livelihood. Beekeepers at Mille Fleurs have discussed the need for livelihood insurance. One beekeeper there told me that they "build up assets like those who keep goats or sheep." A semi-commercial beekeeper has twenty to thirty hives, worth EC$1,500 each. Another LPP purchaser I spoke to whose policy was paid out after the 2013 trough, whom I will call Joseph, is also a beekeeper. He is a member of the St. Lucian Association of Beekeepers (SLAB). Like the Mille Fleurs beekeepers, Joseph said that SLAB members also are interested in drought insurance. When I asked him if he talks about insurance with other beekeepers, he said: "Recently, we were talking about drought insurance [at SLAB], and how we would buy it, but none is available." He thought that there would be considerable demand for a policy that was specifically for them, not a universal policy like LPP. He

bought LPP because he has had losses in the past, and wanted to see if LPP could help him in the future.

A few days before the trough, policyholders received an SMS message that the tropical system was approaching St. Lucia. On December 28th, four days after the rain and flooding, they received another SMS notifying them of the amount of the payout. By Friday, January 3rd, the policyholders had received the money in their bank accounts. Both Michael at Mille Fleurs and Joseph at SLAB agreed that the execution of the payout was good, and compared favorably to the processes for other insurance products, like WINCROP. Mille Fleurs put the money into their general operating expenses and used it as they had in previous times of hardship. Joseph bought the policy to cover the North half of St. Lucia. While he had some losses from the trough, losses were much greater from the drought in the 2015 summer when his bees lacked nectar, and he lost whole colonies. Joseph bought another policy after the trough, but there was not a payout. He decided to not buy LPP again because it did not cover droughts. Mille Fleurs bought policies for the North and South again twice since the trough. Michael is skeptical about its efficacy for beekeepers, though. "I'm not sure how much livelihood protection it will give," he told me. Ultimately, he thought that LPP "is not well thought-out… It's a good idea but not for the honey producing sector."

The goal of selling LPP mainly to low-income people with precarious livelihoods has had mixed success. In the first 31 months, 18% of the policies were bought by those who worked in finance, such as accounting, banking, and insurance; 22% of policies were bought by others with office jobs, such as those in commerce, education, government, medical research, and electronics; and 42% of the policies were bought by those in agriculture (Data from EC Global).[3] One explanation for why 40% of policies were bought by those with presumably stable and well-paying jobs – in finance and the professional sector – is that the premium for LPP is almost double the median expected premium found in the demand survey. The large share of purchasers from finance and office workers does not align with the goals of LPP's designers. MCII was targeting low-income workers in vulnerable sectors, like agriculture and tourism, who were self-employed, and responsible for the losses to their livelihood. A banker, however, will very likely not lose her job, or be responsible for work-related losses from a storm. Through interviews with the underwriter, EC Global, it was clear that a significant interest in the product was due to its ability to serve as a cheaper form of property insurance for damage from high-speed winds and flooding. EC Global's claims supervisor also attributed the high rates of purchases by those in finance to their exposure to LPP in their workplace and wanting to buy it as an inexpensive experiment.

The five LPP policies sold between the product's introduction to the market on May 29, 2013 and the trough almost seven months later represent a slow start for the product. According to EC Global, LPP's underwriter, the newspaper and radio stories in St. Lucia about the quick payout after the trough are the likely explanation for the uptick in sales that began on February 2, 2014. (See Fig. 3.) In that month alone, 15 policies were sold. The following hurricane season (June-November) saw great interest: 74 of the 139 total policies were sold during those six months. One message that was pushed by the underwriter during the LPP media coverage was that the trough showed that storm insurance was necessary year-round (Interview, EC Global's claims supervisor). But purchasers did not seem to agree. Interest in the product fell off after that, with only 33 more policies sold in the next 15 months, up to December 2015. The only exception to the low monthly sales were June 2015 (13 policies) and September 2015 (9 policies). These purchases likely represent the yearly renewal of some of the policies bought during the high-volume hurricane season twelve months before. If we assume that all of these are renewals, then at most 40% of the purchases in 2014 were renewed.

6.1. Basis risk and other mismatches

One of the principal drawbacks of WII is that because the variables that trigger payouts do not measure real losses, policyholders can experience *basis risk*. This occurs when the losses estimated by the proxy measurement are not correct (Roth and McCord, 2008). As an example within LPP for wind in the North zone of St. Lucia, we can think of a scenario where the policyholder experiences 65 mph of wind – and the trigger is 62 mph – but the satellite only measures 60 mph. Any losses would then be uncompensated because the WII trigger was not reached. Although basis risk encompasses both the situation of more money being paid out than needed, as well as less, the focus in the literature is on the downside of basis risk, as in my example above. If the index underestimates a policyholder's real losses – for example, the index has a trigger set too high, or the index was insufficiently sensitive to temporal variations of, say, when rain is needed – the policyholder will be poorer for the loss of both her assets and her premium. The designers of index insurance thus seem to be caught in a dilemma. If they make the trigger event transparent and easily observable in the goal of creating an objective index that is not an incomprehensible "black box" that neither regulator or policyholder can understand, they increase the basis risk of their policyholders by constructing an index that cannot accurately reflect the complexities and differential losses in the real world (MacKenzie, 2009).

The beekeepers who bought LPP had a different concern, though, and experienced a different kind of mismatch. Instead of the satellite measuring a different value of the variable, the mismatch is that the variable itself – that is, the variable representing which hazard is being measured – may be of the wrong kind: it is for storms instead of drought. There are good arguments for choosing either storms or drought, or both, as the hazard that LPP covers. While storms affect more St. Lucians than drought, the latter is a major concern for the vast majority of poor agricultural workers who do not have access to irrigation. With LPP being sold as a universal form of livelihood insurance, the focus on hazards excludes many low-income St. Lucians. We also need to consider a third kind of mismatch with LPP, which was experienced by banana farmers in St. Lucia. Although no banana farmers whom I interviewed possessed one of the five policies that paid out in the December 2013 storm, many banana farmers who did own an LPP policy were concerned that banana damage can begin at 40 mph, well below the first payout trigger for policies covering either the North or the South. In this case, the mismatch is that the payout equation does not fit the banana farmers' vulnerability to the hazard of high-speed wind. While basis risk is of concern to all WII products, the two mismatches that I have identified – that of hazard type and trigger placement – address fundamental aspects of vulnerability. The first concerns what hazards the policyholder is exposed to, and the second concerns the policyholder's sensitivity to the hazards.

These mismatches result from LPP's universality, and from the way that it flattens environmental and social difference so that all policyholders are compensated equally given the same trigger. Consequently, the way that social factors were ignored, and reduced in calculations to a simple constant, rendered the product undesirable for the beekeepers and banana farmers in St. Lucia who bought LPP. And given that the foundation of LPP's relatively low cost was this constructed homogeneity, we can see how this rejection by LPP's purchasers is a direct criticism of LPP. While the potential customers that I interviewed recognized that LPP might be a good fit for someone, they thought that it did not fit themselves particularly well. For these St. Lucians, the concern was not so much that the losses and payouts might not match on occasion – the usual WII drawback known as basis risk – but that the losses and payouts might never match because they were subject to different hazards. When the model compensates for hazards that are of

[3] In addition, 8% of the policies had the occupation listed as the automotive or construction trades, and another 10% had the occupation listed as "blank" or under the phrase "Essential Services".

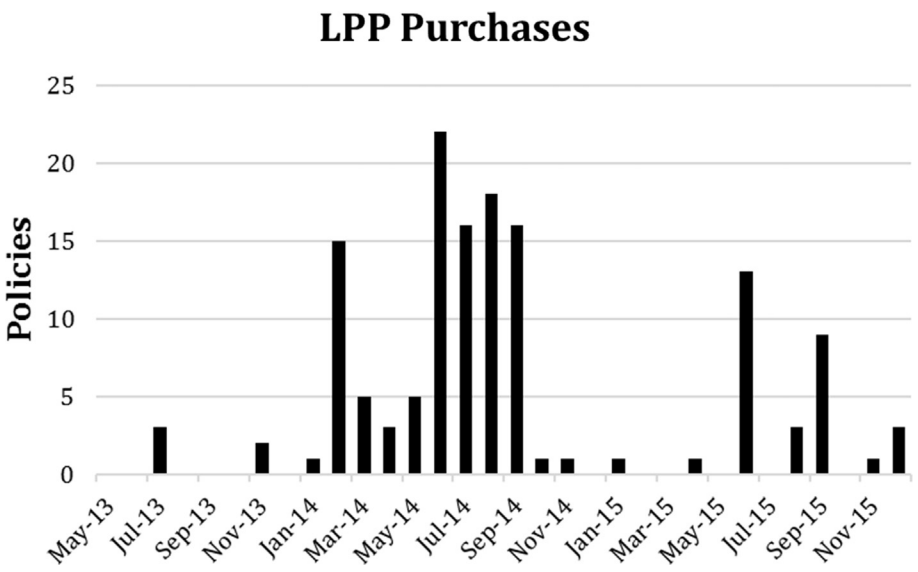

Fig. 3. LPP policies sold per month in St. Lucia from May 29, 2013 to December 17, 2015.

relatively small concern to a potential customer, this is a matter of having the wrong variables, rather than mismatched values of correct variables, as in basis risk.

LPP in St. Lucia is positioned on a scale between insurance that is targeted at individuals, like WINCROP, and insurance targeted at a country, like CCRIF. LPP policyholders seem to have the worst of both worlds, however. The product pays out specific individuals, but in its design no particular group of individuals was identified beyond the population of low-income St. Lucians. The decision of the Mille Fleurs honey producing association to buy the product year after year to insure their members collectively has significant consequences. While the members themselves were uninterested in purchasing the product, the application of LPP to the group level creates the opportunity to more closely match the focus of the measurement with a scale larger than an individual. If LPP were tied to losses assessed to particular individuals, like WINCROP, then Mille Fleurs would not have been able to transform the scale of the insurance. In a sense, Mille Fleurs adapted LPP to its better scale of use. Not only does group-level WII smooth out basis risk, but it puts the distribution of funds in the hands of local people who know where they should go, rather than leaving it up to the random intersection of a specific measurement location and the policyholders' distribution around the payout zone.

Kevin Grove's work on CCRIF has argued that the function of parametric insurance, which is targeted at the level of the state, is not about covering any specific losses from storms (Grove, 2012), but rather to maintain a secure state. We can see this, in part, from the way that CCRIF payments are not directed to particular government agencies responsible for reconstruction. Rather, the goal of the payments is to ensure that the state's functioning continues as before, with a reduced possibility of groups using the state's weakness to transform it into a new direction. This reasoning is in keeping with insurance's inherently conservative nature, where it serves to return a system to the status quo before the hazard event. Grove's analysis is helpful to understand LPP because the adjustment purpose of the tool is similar in helping to prevent social disruption. It is meant to keep people from falling below the poverty line – and so disturbing the social order within St. Lucian's precarious globalized economy – rather than allowing people to better adapt to climate change. If we consider InsuResilience as a combination of individual-level WII products like LPP, and state-level ones like CCRIF, then we can similarly understand the project as a way to bolster climate security. The G7 supports InsuResilience because it is a way to use insurers as an intermediary to distribute aid using so-called objective indices. When Global South countries suffer climate hazards so severe that they risk their own stability, or harm to other countries, then InsuResilience payments can be used by governments to maintain order, whether that be to maintain public health or to reduce the number of climate refugees.

7. Conclusion

"At last it is discovered [by gamblers] that insurers not only need not own ships or horses or houses or any of the things they insure, but that they need not exist."

"The Vice of Gambling and the Virtue of Insurance,"
George Bernard Shaw, 1944.

In the essay "The Vice of Gambling and the Virtue of Insurance," Shaw compares the methods and purposes of gambling and insurance, two lucrative institutions concerned with risk (Shaw, 1956). At one point he mischievously suggests that the main difference between the two is that insurance houses are stuck with needing particular things to exist – the "ships or horses or houses" – before they can sell an insurance contract. Gambling houses, on the other hand, can supply the same deck of cards to endless customers, making profit off of pure risk. This article has shown how weather index insurance (WII) allows financial companies to sell insurance contracts on nothing but the risk of a hurricane turning up. Instead of sending adjustors into the field to inspect real damages, weather data is collected to estimate losses. In the end, because physical goods are never inspected, before or after a storm, they need not exist.

As a universal form of WII, LPP was designed to appeal to any low-income St. Lucian whose livelihood, and wider well-being, is threatened by extreme weather events. This universality, however, undermined the utility of the product because it ended up not being a good fit for anyone in particular. The decisions that MCII made about what hazard to cover – storms instead of drought – and the placement of the wind and rainfall values to trigger payouts were chosen so as to appeal to the largest number of people. This search for a broad audience in St. Lucia was reflected in the goal of selling a universal WII product like LPP to 100 million similar people in the Global South under the InsuResilience program. The problems of LPP in St. Lucia, driven by creating an easily adaptable insurance product that can possibly be profitable to financial companies, may be experienced wherever InsuResilience takes hold.

The failure of LPP to reach a broad audience is a failure to reduce the vulnerabilities of low-income St. Lucians through WII. But LPP's failure provides an opening for more transformative adaptations that do

take into account the social relations of production that LPP excludes (Bassett and Fogelman, 2013). Assisting low-income St. Lucians to better prepare for extreme weather events means addressing the root causes of vulnerability, including poverty and social exclusion, rather than looking for a technical fix. The acceptance of L&D as another dimension to managing the effects of climate change, alongside adaptation and mitigation, is a welcome addition to climate governance. However, it should be used as a last effort to compensate for climate losses rather than to further enroll vulnerable people in the Global South into finance with tools ill-suited to their needs. In future research, environmental social scientists need to continue to examine the particular realities behind the universal abstractions of financial tools for L&D.

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